

CLAIMS

What is claimed is:

1 1. A tunable capacitive bridge configured to couple a ladder network comprising
2 coupling elements and a plurality of shunt elements, the tunable capacitive bridge comprising:
3 a first tunable capacitor coupled in parallel with a coupling element, a first end of the
4 first tunable capacitor coupled with a first shunt element and a second end of
5 the first tunable capacitor coupled with a second shunt element; and
6 a second tunable capacitor and a third tunable capacitor coupled in parallel with the
7 first tunable capacitor,
8 a first end of the second tunable capacitor coupled with the first end of the
9 first tunable capacitor and the first shunt element, and
10 a first end of the third tunable capacitor coupled with the second end of the
11 first tunable capacitor and the second shunt element.

1 2. The tunable capacitive bridge of claim 1, wherein the second end of the second
2 tunable capacitor couples with a ground.

1 3. The tunable capacitive bridge of claim 1, wherein the second end of the third tunable
2 capacitor couples with a ground.

1 4. The tunable capacitive bridge of claim 1, wherein the first tunable capacitor
2 comprises a thin-film barium strontium titanate ("BST") capacitor.

1 5. The tunable capacitive bridge of claim 1, wherein the second tunable capacitor
2 comprises a thin-film barium strontium titanate ("BST") capacitor.

1 6. The tunable capacitive bridge of claim 1, wherein the third tunable capacitor
2 comprises a thin-film barium strontium titanate ("BST") capacitor.

1 7. The tunable capacitive bridge of claim 1, wherein each of the first tunable capacitor,
2 the second tunable capacitor, and the third tunable capacitor comprises a thin-film barium
3 strontium titanate ("BST") capacitor.

1 8. The tunable capacitive bridge of claim 1, wherein at least one shunt element
2 comprises a reactive element.

1 9. The tunable capacitive bridge of claim 1, wherein at least one shunt element
2 comprises a small section transmission line.

1 10. A tunable capacitive bridge configured to couple a ladder network comprising a
2 coupling element coupled in parallel with a shunt element, the tunable capacitive bridge
3 comprising:

4 a first tunable thin-film barium strontium titanate ("BST") capacitor coupled in
5 parallel with the coupling element and the shunt element; and

6 a second tunable thin-film BST capacitor and a third tunable thin-film BST capacitor
7 coupled in parallel with the first tunable thin-film BST capacitor and the
8 coupling element and the shunt element.

1 11. The tunable capacitive bridge of claim 10, wherein the coupling element comprises
2 one of a resonant and a non-resonant element.

1 12. The tunable capacitive bridge of claim 10, wherein the coupling element comprises at
2 last one from a group consisting of a capacitor, inductor, a resistor, and a transmission line.

1 13. The tunable capacitive bridge of claim 10, wherein the shunt element comprises at
2 least one from a group consisting of a capacitor, an inductor, a resistor, and a transmission
3 line.

1 14. The tunable capacitive bridge of claim 10, wherein the second tunable thin-film BST
2 capacitor and the third tunable thin-film BST capacitor couple with a ground.

1 15. The tunable capacitive bridge of claim 10, wherein the shunt element couples with a
2 ground.

1 16. A tuning circuit comprising:
2 a bridge circuit comprising a first adjustable capacitance grouping, a second
3 adjustable capacitance grouping and a third adjustable capacitance grouping,
4 each adjustable capacitance grouping comprising at least one tunable
5 capacitor and a bias port; and
6 a first lead and a second lead, the leads configured to couple the bridge circuit with a
7 coupling element and a shunt element.

1 17. The tuning circuit of claim 16, wherein the tunable capacitor comprises a thin-film
2 barium strontium titanate ("BST") capacitor.

1 18. The tuning circuit of claims 16, wherein at least one of adjustable capacitance groups
2 further comprises a bulk capacitor.

1 19. The tuning circuit of claim 18, wherein the tunable capacitor is set to a value
2 substantially equivalent to the bulk capacitor in that adjustable capacitance group.

1 20. The tuning circuit of claim 16, wherein the bias port is configured to receive a bias
2 voltage.

1 21. The tuning circuit of claim 20, wherein the bias port further comprises a bias
2 resistance.

1 22. A tuning circuit comprising:
2 a bridge circuit comprising a first adjustable capacitance grouping, a second
3 adjustable capacitance grouping and a third adjustable capacitance grouping,
4 each adjustable capacitance grouping comprising at least one tunable thin-film
5 barium strontium titanate ("BST") capacitor and a bias port, the bias port
6 configured to couple a bias voltage; and
7 a first lead and a second lead, the leads configured to couple the bridge circuit with a
8 coupling element and a shunt element.

1 23. The tuning circuit of claim 22, wherein at least one adjustable capacitance group
2 further comprises a bulk capacitor.

1 24. The tuning circuit of claim 23, wherein the tunable BST capacitor is set to a value
2 substantially equal to a value of the bulk capacitor in that adjustable capacitance group.

1 25. The tuning circuit of claim 22, wherein at least one adjustable capacitance group
2 further comprises a second tunable thin-film BST capacitor.

1 26. The tuning circuit of claim 24, wherein the second tunable thin-film BST capacitor is
2 set to a value substantially equal to the first tunable thin-film BST capacitor in that adjustable
3 capacitance group.

1 27. The tuning circuit of claim 22, wherein the bias port further comprises a bias resistor.

1 28. A tuning circuit comprising:
2 a means for reactance adjustment within an electrical circuit, further comprising a
3 first means for adjusting capacitance, a second means for adjusting
4 capacitance, and a third adjusting capacitance, each means for adjusting
5 capacitance comprising

6 at least one means for capacitance having a high intrinsic capacitance density
7 and a field-dependent electrical permittivity, and
8 a means for receiving a bias voltage; and
9 a means for coupling the means for reactance adjustment with a means for coupling
10 and a means for shunting in the electrical circuit.

1 29. The tuning circuit of claim 28, wherein the means for coupling includes a first port
2 and a second port.

1 30. The tuning circuit of claim 28, wherein the means for capacitance comprises a thin-
2 film barium strontium titanate ("BST") capacitor.

1 31. The tuning circuit of claim 29, wherein the means for capacitance further comprises a
2 second thin-film BST capacitor.

1 32. The tuning circuit of claim 31, wherein the second tunable thin-film BST capacitor is
2 set to a value substantially equal to the first tunable thin-film BST capacitor in the means for
3 capacitance.

1 33. The tuning circuit of claim 28, wherein the means for receiving a bias voltage further
2 comprises a bias resistor.